

WHAT IS CLAIMED IS:

1. A method for fabricating a light-emitting device, the method comprising:

(a) sequentially forming a first compound semiconductor layer, an active layer, and a second compound semiconductor layer, which are for inducing light emission, on a high-resistant substrate;

(b) forming a light-transmitting conductive layer on the second compound semiconductor layer;

(c) etching a region of the high-resistant substrate to expose the first compound semiconductor layer; and

(d) forming a high-shielding conductive layer to cover the exposed region of the first compound semiconductor layer.

2. The method of claim 1, wherein step (c) comprises: polishing the bottom of the high-resistant substrate; and exposing the bottom of the first compound semiconductor layer by etching the region of the high-resistant substrate.

3. The method of claim 2, wherein the high-resistant substrate is a sapphire substrate.

4. The method of claim 2, wherein the bottom of the high-resistant substrate is polished by grinding or lapping.

5. The method of claim 1, wherein the high-resistant substrate is dry etched using a reaction gas comprising at least Cl_2 or BCl_3 .

6. The method of claim 5, wherein the reactant gas further comprises Ar gas.

7. The method of claim 2, wherein the high-resistant substrate is dry etched using a reaction gas comprising at least Cl_2 or BCl_3 .

8. The method of claim 7, wherein the reactant gas further comprises Ar gas.

9. The method of claim 2, wherein the high-resistant substrate is etched to form a via hole through which the bottom of the first compound semiconductor layer is exposed.

10. The method of claim 2, wherein the high-resistant substrate is etched to remove the remaining region other than the region of the high-resistant substrate.

11. The method of claim 1, further comprising forming a pad layer on the light-transmitting conductive layer.

12. A method for fabricating a light-emitting device, the method comprising:

(a) sequentially forming a first compound semiconductor layer, an active layer, and a second compound semiconductor layer, which are for inducing light emission, on a high-resistant substrate;

(b) forming a light-reflecting conductive layer on the second compound semiconductor layer;

(c) etching a region of the high-resistant substrate to expose the first compound semiconductor layer; and

(d) forming a light-transmitting conductive layer to cover the exposed region of the first compound semiconductor layer.

13. The method of claim 12, wherein step (c) comprises:
polishing the bottom of the high-resistant substrate; and
exposing the bottom of the first compound semiconductor layer by etching the region of the high-resistant substrate.

14. The method of claim 13, wherein the high-resistant substrate is a sapphire substrate.

15. The method of claim 13, wherein the bottom of the high-resistant substrate is polished by grinding or lapping.

16. The method of claim 12, wherein the high-resistant substrate is dry etched using a reaction gas comprising at least Cl_2 or BCl_3 .

17. The method of claim 16, wherein the reactant gas further comprises Ar gas.

18. The method of claim 13, wherein the high-resistant substrate is dry etched using a reaction gas comprising at least Cl_2 or BCl_3 .

19. The method of claim 18, wherein the reactant gas further comprises Ar gas.

20. The method of claim 13, wherein the high-resistant substrate is etched to form a via hole through which the bottom of the first compound semiconductor layer is exposed.

21. The method of claim 13, wherein the high-resistant substrate is etched to remove the remaining region other than the region of the high-resistant substrate.

22. The method of claim 12, further comprising forming a pad layer on the light-transmitting conductive layer.

23. A method for fabricating a light-emitting device, the method comprising:

- (a) forming a material layer for lasing on a high-resistant substrate;
- (b) forming a first electrode on the material layer;
- (c) etching a region of the high-resistant substrate to expose a region of the material layer; and
- (d) forming a second electrode on the bottom of the high-resistant substrate to cover partially or fully the exposed region of the material layer.

24. The method of claim 23, wherein step (a) comprises:
sequentially forming a first compound semiconductor layer, a first cladding layer, a resonator layer, a second cladding layer, and a second compound semiconductor layer on the high-resistant substrate;
forming a mask pattern on the second compound semiconductor layer to cover a predetermined region of the second compound semiconductor layer;
sequentially patterning the second compound semiconductor layer and the second cladding layer using the mask pattern as an etch mask, the second cladding layer into a rigid form;
removing the mask pattern; and
forming a passivation layer on the second cladding layer patterned into the ridge form, in contact with a region of the patterned second compound semiconductor layer.

25. The method of claim 24, wherein step (c) comprises:
polishing the bottom of the high-resistant substrate; and
exposing the bottom of the first compound semiconductor layer by etching the region of the high-resistant substrate.

26. The method of claim 25, wherein the high-resistant substrate is a sapphire substrate.

27. The method of claim 25, wherein the bottom of the high-resistant substrate is polished by grinding or lapping.

28. The method of claim 23, wherein the high-resistant substrate is dry etched using a reaction gas comprising at least Cl_2 or BCl_3 .

29. The method of claim 25, wherein the high-resistant substrate is dry etched using a reaction gas comprising at least Cl_2 or BCl_3 .

30. The method of claim 28, wherein the reactant gas further comprises Ar gas.

31. The method of claim 29, wherein the reactant gas further comprises Ar gas.

32. The method of claim 25, wherein the high-resistant substrate is etched to form a via hole through which the bottom of the first compound semiconductor layer is exposed.

33. The method of claim 25, wherein the high-resistant substrate is etched to remove the remaining region other than the region of the high-resistant substrate.

34. The method of claim 24, wherein the resonator layer is formed by sequentially forming a first waveguide layer, an active layer, and a second waveguide layer on the first cladding layer.

35. The method of claim 23, wherein step (d) comprises:
forming an ohmic contact layer on the bottom of the high-resistant substrate to cover partially or fully the exposed region of the material layer;
and
forming a thermal conductive layer on the ohmic contact layer.